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advanced ornithologist of the Eastern States is provided with the latest and most complete epitome of the subject which he could wish for. Indeed it will now, we should think, be a difficult problem for the ornithological book maker to know how to plan another book at all original, either in scope or treatment. What between keys, check lists, manuals and ornithological biographies, the field of avian biology has been pretty well covered, although not entirely. We yet need, we think, elaborate, detailed, circumstantial bird lives; we require the results of more prolonged field studies. For example, we have been unable to find in a number of books at hand, how long the robin is engaged in building its nest, just when its eggs are laid, etc.; the book before us does not state whether the kingfisher uses the same hole year after year. Questions of this sort put to us by an incipient ornithologist of eleven years, we cannot answer from the books at hand. Moreover many of our ornithologists are boys from ten to sixteen years of age; they do not find even in books like the present such details of bird life as are suggested above, and on the other hand they are repelled here and there by hard words, words which we sometimes cannot explain to them. Technical expressions and words which save but a few letters or syllables should in such books as the present be substituted for more round-about but comprehensible expressions. The boy's book of birds has therefore yet to be written, and perhaps this will be the next ornithological book to be offered to the public.

Yet with its slight shortcomings the present is a most admirable, fresh manual, and will for many a day lead the list of our semi-popular ornithological books. It is handy, compact and reasonable in price, well printed and tolerably well illustrated.

The work describes both the land and water birds, and represents the entire bird fauna of New England.

LATE WORKS ON EVOLUTION.[1]—Books and pamphlets on this prolific theme are multiplying, and authors, both amateur and expert, treat it from biological, metaphysical and theological standpoints. Amid much diversity, there is a general agreement in the sentiments of the authors whom we quote below, in their dissatisfaction with the bald Darwinism of Tyndall, and the onesidedness of Haeckel and his imitators. This sentiment has found expression in both England and America by strong advocates of organic evolution, who find natural selection insufficient to account for the existing characters of living beings. Some, like A. W. Bennett and the botanists generally, have contented themselves with objecting. Zoölogists, who are more familiar with the effect of motion on structure, seek for the "origin of the fittest" with greater hope of result, and it is among this class that the hypothesis of the origin of structure by "use and effort" has been chiefly advocated. Darwin himself never grasped this side of the evolution question, as may be seen in the following extracts from a letter of his to the *Spectator* (London) of Jan. 11, 1873:

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[1] *The Theories of Darwin and their relations to Philosophy, Religion and Morality.* By RUDOLF SCHMID, president of the Theological Seminary at Schonthal, Wurtemburg. Chicago, Jansen, McClurg & Co.

Final Causes. By PAUL JANET. New York, Chas. Scribner's Sons, 1883. Translated from the second edition of the French, by William Affleck, B.D.

A Critique of Design-arguments; a historical review and free examination of the methods of reasoning in Natural Theology. By L. E. HICKS. New York, Chas. Scribner's Sons, 1883.

Development, what it can do and what it cannot do. By JAMES MCCOSH, D.D. New York, Chas. Scribner's Sons, 1883.

Natural Selection and Natural Theology, a discussion between Dr. Romanes and Dr. Asa Gray in *Nature,* Vol. XXVI, 1883.

"SIR:—Any one interested in the subject to which you allude at p. 42 of your last number, namely, the relative importance in causing modifications of the body or mind, on the one hand of habit or of the direct action of external conditions, and on the other hand of natural or artificial selection, will find this subject briefly discussed in the second volume (pp. 301–315) of my 'Variation of Animals and Plants under Domestication.'

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"I have made many observations and collected many facts showing the potent influence of habit and of the use or disuse of parts on organic beings; but there are numberless peculiarities of structure and of instinct (as in the case of sterile neuter insects) which cannot be thus accounted for. He would be a bold man who would attempt to explain by these means the origin of the exsertile claws and great canine teeth of the tiger; or of the horny lamellæ on the beak of the duck, which are so well adapted for sifting water. Nor would any one, I presume, even attempt to explain the development, for instance, of the beautifully plumed seeds of the dandelion, or of the endless contrivances which are necessary for the fertilization of very many flowers by insects, through gradually acquired and inherited habit, or through the direct action of the external conditions of life."

Now, it is precisely what Mr. Darwin here declares to be so difficult that the *causal evolutionists*, as distinguished from the *selective evolutionists*, set themselves to accomplish. That is, firstly, to show that in the case of animals and plants incapable of movements of their own, their structure has been modified in descent by the influences of their environment, while in the case of those beings that can move, modification is the combined result of the mutual interaction of the organism and its environment together. Since the general result displays adaptation, the causal school must ultimately discover whether it be intelligence which is thus displayed or not, and if so, whence it proceeds.

The botanists are here in a greater dilemma than the zoölogists, but the extraordinary discoveries of the relations of insects to plants, bid fair to extricate them from their difficulty.

Of course the theologians, who chronologically follow the scientists at a safe distance, are now in the Darwinian woods, and are trying to hew a way out. The question with Messieurs Janet and Hicks is, not whether evolution be true, they accept this latest dictum of science, but whether it be a result of design as indicated by the causal school, or by chance, as follows from the teaching of the selective or Darwinian school. On the truth of the former doctrine depends the belief in intelligent creation. The latter form of doctrine cannot admit of any such origin of things, for, as Huxley has said, "teleology, as commonly understood, has received its death-blow at Mr. Darwin's hands." Of course the theologists, anxious to preserve and demonstrate the doctrines of theism, seek for proof of design in evolution. This leads them at once into conflict with Darwinism.

The works of Janet, Schmid and Hicks are what one might term theologico-philosophical or philosophico-theological. They agree in their general inefficiency and inadequacy in dealing with the phenomena of the actual world. They display little or no knowledge of the sciences on which the principles of evolution rest, viz., embryology and palæontology. This being true, a good deal of space appears, to the critical reader, to be occupied with unnecessary and feeble discussion of the subject. Thus Schmid tells us there are four theories of creation, viz., by selection, by evolution, by descent, by direct creation! He sustains the third of these supposed distinct doctrines. We think Dr. Schmid's book the weakest of the three, and a person who desires to have any clear idea of the doctrine of evolution had better avoid it.

Janet's work is an abler production. It is a prolonged investigation of the probabilities of the truth of the teleological and antiteleological schools of evolution. Probably had the writing of the work been postponed to the present time, the learned author would have materially altered his views as to the nature of the evidence obtainable, and would have discovered that there are two totally distinct kinds of teleology. He opposes the Darwinians, using Bennett's effective arguments against "omnifarious variation," but he sustains the untenable position of Milne Edwards respecting the nature of the animal mind.

Professor Hicks has written a polemical work in support of theism by a doctrine which he calls eutaxiology. He distinguishes it from teleology, as expressive of the general order of the universe; the latter being defined as the law of foreordination of means to definite ends in creation.

The attitude of Dr. McCosh towards natural science has always been liberal, and he has greatly aided the theological world in understanding the doctrine of evolution. He, too, is an objector to pure Darwinism, but has no scientific hypothesis to offer in its stead. His strongest objections are directed against the experimental and derivative hypothesis of the evolution of mind. He insists on the intuitive origin of some of the higher mental faculties. In this we cannot follow him. His pamphlet is written in a fair and conciliatory spirit.

To one who may desire to see the views of two of the advocates of the originative and selective schools of evolution set forth, we recommend the reading of the discussion between Dr. Asa Gray and Mr. Romanes which appeared in *Nature*, closing with the number of May 24, 1883. We quote the following words from Dr. Gray, which repeat essentially the views expressed by Dr. Bennett and ourselves[1] at various times:

"I take Dr. Romanes now to agree with me that the physical distinction of the less fit organism, or, more generally, that the action of the environment, is not in a proper sense the cause of the advantageous variations of surviving organisms; also that natural selection does not explain and has no call to explain the cause of variation. As to this, he says, the theory merely supposes that variations of all kinds and in all directions are constantly taking place, and that natural selection seizes upon the more advantageous. Now, if variation in animals and plants is lawless, of all kinds and in all directions, then no doubt the theory of natural selection may be 'the substitute of the theory of special design,' so as to efface that evidence of underlying intelligence which innumerable and otherwise inexplicable adaptations of means to ends in nature were thought to furnish. If it is not so, then the substitute utterly fails. For omnifarious and purely casual variation is essential to it in this regard. Fitly is it said that 'the theory merely supposes' this. For omnifarious variation is no fact of observation, nor a demonstration, or, in my opinion, even a warrantable inference from observed facts. It is merely an hypothesis, to be tried by observation and experiment." * * "But there is no evidence that all sorts of varieties ever appeared or tended to appear, and there is a musty maxim about 'de non apparentibus et de non existentibus,' which is not devoid of application." * * "The upshot is, that so far as observation extends, it does not warrant the supposition of omnifarious and aimless variation, and the speculative assumption of it appears to have no scientific value."—*C.*

VIALLANES' HISTOLOGY AND DEVELOPMENT OF INSECTS.—This laborious work occupies 348 pages, indeed forming nearly an entire volume (XIV) of the Annales des Sciences Naturelles. It is illustrated by eighteen excellent, sharply-drawn, lithographic plates. Besides the purely histological treatment, M. H. Viallanes, inspired by the epoch-making work of Weismann, has made a detailed study of the histological phenomena which accompany the post-embryonic development of insects.

The work is divided into three parts. The first comprises a

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[1] NATURALIST, 1882, p. 457.